

Response to Office Action of: 10/19/2005
Response Dated: 01/19/2006
Title: Apparatus For Tightening Threaded Member

App. No.: 10/525,656
Inventor: Shuji Sasaki
Examiner: Shantese McDonald

Amendment(s) to the Claims

The following listing of claims replaces all prior versions and listings of claims in the present application:

Listing of Claims:

Claims 1-4 (canceled).

Claim 5 (original): An apparatus for tightening a threaded member to a workpiece, the apparatus shuttling between the workpiece and a supplying section at which the apparatus is supplied with the threaded member, the apparatus comprising:

- an automatic robot arm;
- a screwing mechanism provided to the automatic robot arm and including a rotational part and a threaded engagement member threadedly engaging the rotational part;
- an axial movement means for axially moving to move the threaded engagement member axially of the rotational part to rotate the rotational part;
- a shaft member axially movably provided to the rotational part via a slide part slidable relative to the rotational part, the shaft member capable of rotating in unison with the rotational part;
- an urging means for urging the shaft member in a direction away from the rotational part;
- a socket portion provided to one end of the shaft member for receiving therein the threaded member in such a manner as to transmit the rotation of the shaft member to the threaded member; and

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a retention means for retaining the threaded member received in the socket portion or retaining the threaded member released from the socket portion.

Claim 6 (original): An apparatus according to claim 5, wherein the axial movement means moves axially to rotate the rotational part in either one direction to tighten the threaded member to the workpiece or the opposite direction to loosen the threaded member out of the workpiece.

Claim 7 (new): An apparatus for tightening a threaded member, comprising:

a screwing mechanism including a rotational shaft and a threaded engagement member threadedly engaging an outer periphery of the rotational shaft;

an axial movement means provided to one of the rotational shaft and the threaded engagement member for axially moving to rotate the rotational shaft;

a shaft member pivotally connected to the rotational shaft and capable of rotating in unison with the rotational shaft;

a socket portion provided to one end of the shaft member for receiving therein the threaded member in such a manner as to transmit the rotation of the shaft member to the threaded member; and

a retention means for retaining the threaded member received in the socket portion or the threaded member released from the socket portion.

Claim 8 (new): An apparatus according to claim 7, wherein the shaft member is hollowed to define a space, and the retention means comprises a rod axially movable and disposed within the space of the shaft member and having a lower end positioned

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in the vicinity of the socket portion, a magnet provided to the lower end of the rod for magnetically holding a head of the threaded member to retain the threaded member received in the socket portion, and a moving means for moving the rod in such a manner as to move the magnet away from the socket portion to retain the threaded member released from the socket portion.

Claim 9 (new): An apparatus for tightening a threaded member, comprising:

a screwing mechanism including a rotational shaft and a threaded engagement member threadedly engaging an outer periphery of the rotational shaft;

an automatic robot arm provided to one of the rotational shaft and the threaded engagement member, the automatic robot arm being axially movable to rotate the rotational shaft;

a shaft member provided to the rotational shaft and capable of rotating in unison with the rotational shaft;

a socket portion provided to one end of the shaft member for receiving therein the threaded member in such a manner as to transmit the rotation of the shaft member to the threaded member; and

a retention means for retaining the threaded member received in the socket portion or the threaded member released from the socket portion.

Claim 10 (new): An apparatus according to claim 9, wherein the shaft member is hollowed to define a space, and the retention means comprises a rod axially movable and disposed within the space of the shaft member and having a lower end positioned in the vicinity of the socket portion, a magnet provided to the lower end of the rod for

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magnetically holding a head of the threaded member to retain the threaded member received in the socket portion, and a moving means for moving the rod in such a manner as to move the magnet away from the socket portion to retain the threaded member released from the socket portion.